

SiLA Rapid Integration[®]



Filling the Automation and Enterprise Gap with Data and Device Standardization

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SiLA Tutorial, Pittcon 2016

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SiLA is a non-profit, global consortium and welcomes companies, research institutions and individuals as members.

Vision— “Our North Star”

- To create laboratory interoperability for optimal profitability and resource efficiency

Mission— How will we get there

- To bring end users of lab equipment together with system/device/software suppliers to develop international standards for equipment/software interfaces and data exchange

- 2015 Highlights
- Data Workgroup
- Process Management System Workgroup
- Discussion



New Members

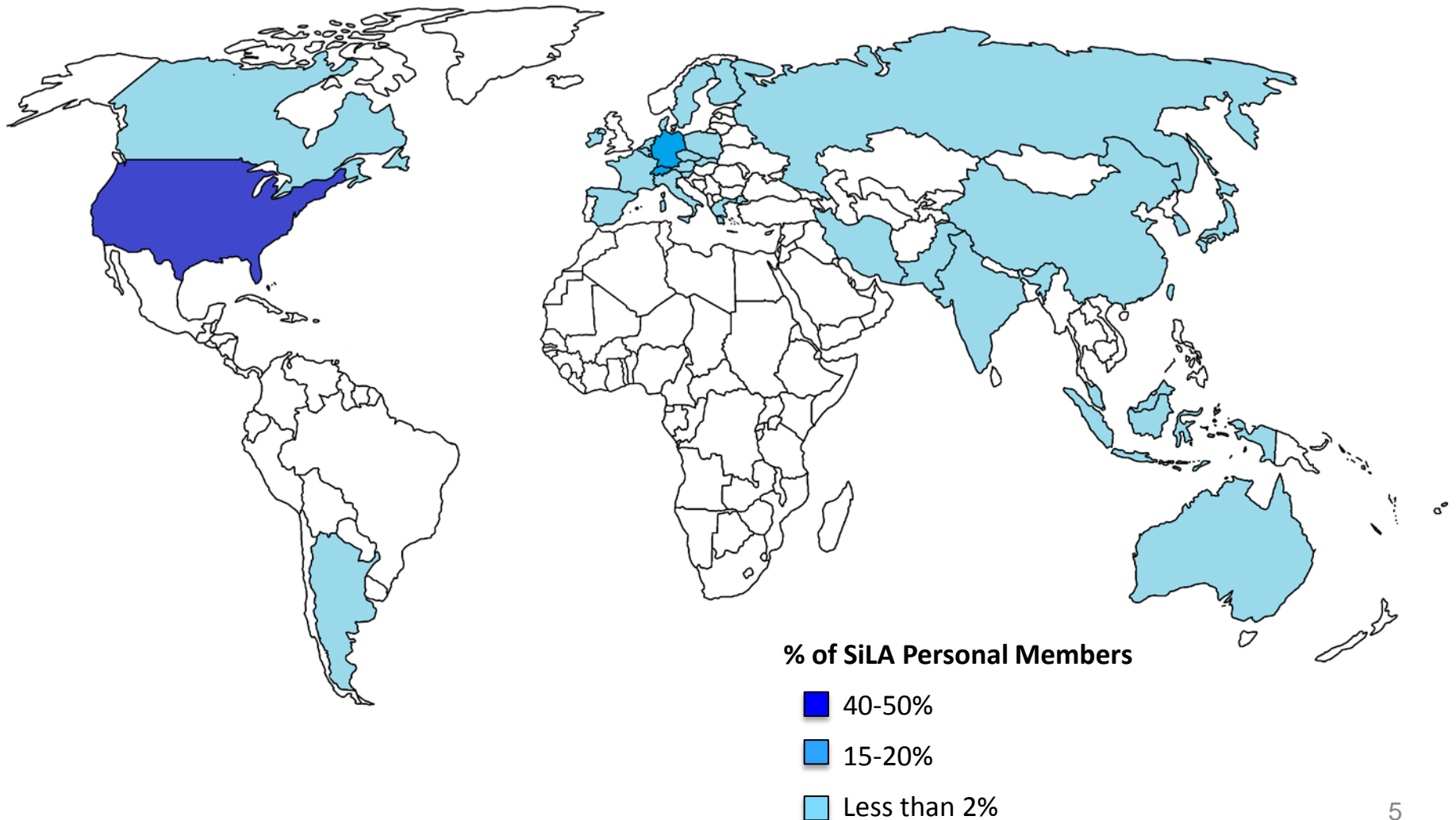
- Glaxo Smith Kline (GSK)
- apartis Information Management
- BSSN Software

...and so far in 2016

- Lab Services

Personal SiLA Member Distribution

~1300 Members (Dec 2015)



SiLA-related Initiatives Program 1/2

Open Source Project

- Members from Promega, Madisoft, Fraunhofer IPA, Wega-IT, UK Robotics, Beckman Coulter
- A new, demo, reference implementation was created and posted in the GitHub repository
- Real instrument driver was derived from the Demo driver
 - Promega GloMax Discover multimode reader
- “**AnIML capabilities**” were added to the Promega’s SiLA Provider for the GloMax Discover instrument.

This was successfully demonstrated during the SLAS exhibition Jan 2016 (see attached application note). Five different companies participated in the demo showing the ability to integrate their software using SiLA.

This is what we plan to add in the next several months:

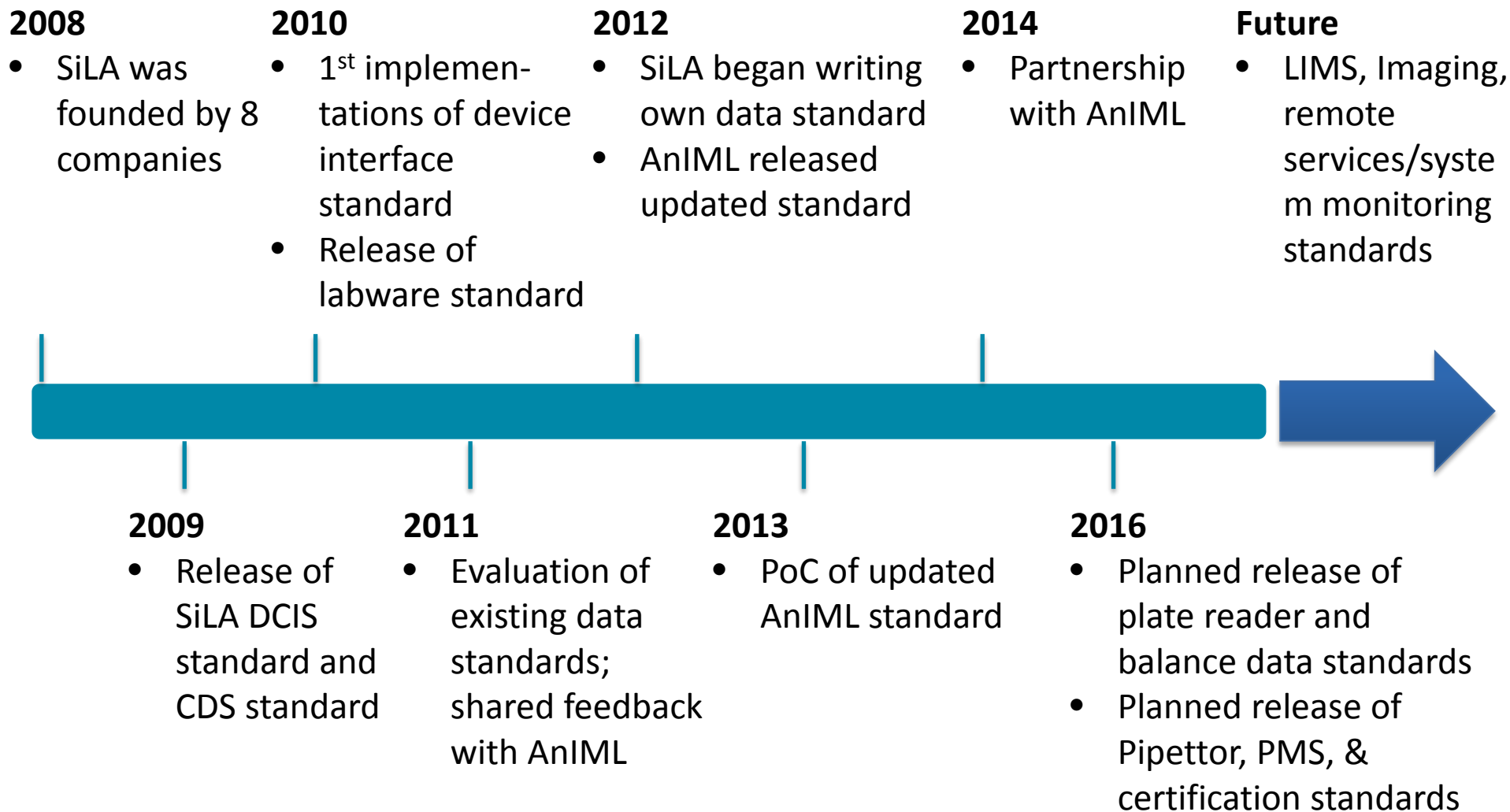
1. **Add a different OS implementation** demo for a SiLA Provider (most likely we will start with an Android, Java-based implementation)
2. Possibly add an **iOS / OS X - based implementation** later on.
3. Possibly add a **reference implementation for a simple SiLA Consumer** in addition to the existing SOFIA web-based / NodeJS JavaScript App.

SiLA Pilot Test Site – (closely linked to “Certification” Working Group)

- Code-Library has been implemented and reviewed
- Feedback from review not yet implemented
- Started integration into niceLAB
- Testing with real hardware to be done in 2016

- Two events (June/Sept 2015) with ~20 people each
- Identify areas of improvements based on experiences in implementing/integrating/applying the SiLA standards
- Evaluate and discuss potential options on solutions aiming to improve the performance and acceptance
- Identify dedicated areas of individual follow-up activities
 - DCDIS: versioning, event mechanisms and state machine, device classes to be more detailed/specific
 - Data Formats: detailed proposals for several device classes with AnIML format

SiLA Roadmap



- 2015 Highlights
- Data Workgroup
- Process Management System Workgroup
- Discussion

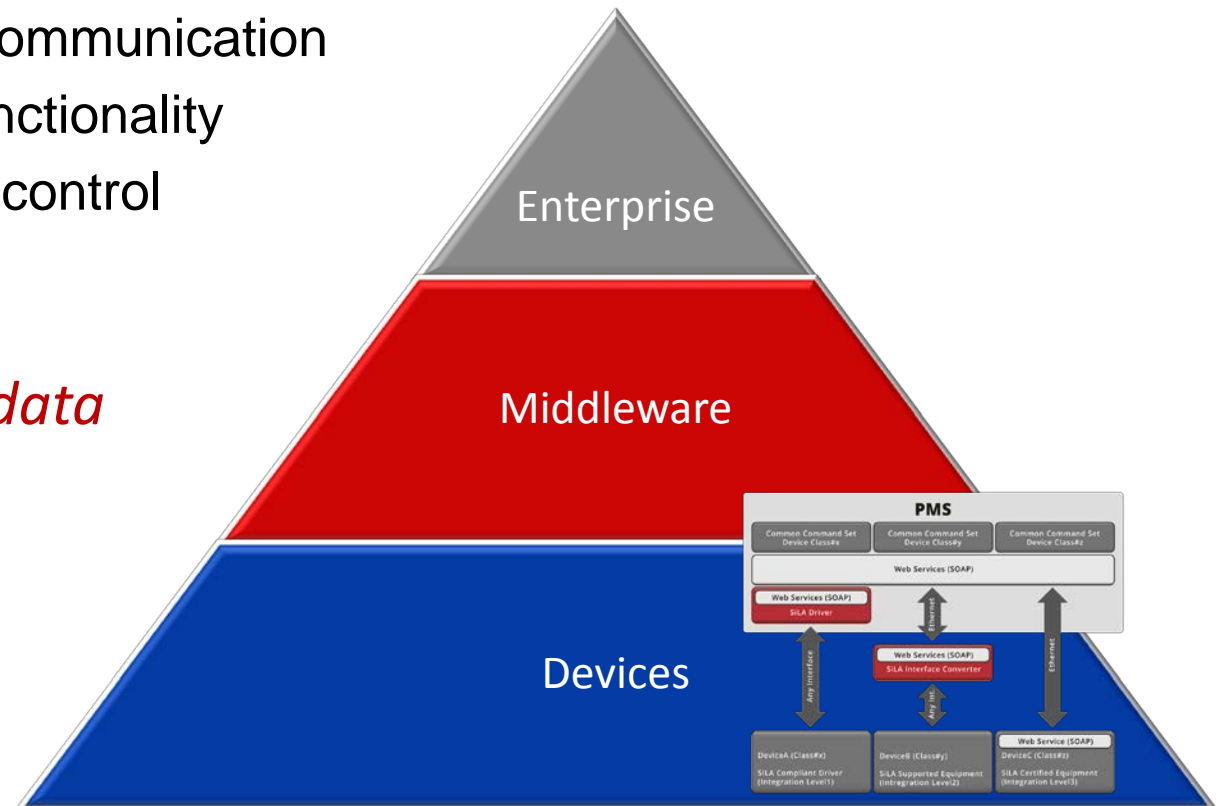


SiLA Standard

Device Control & Interfaces

- First goal: achieved
 - standardized communication
 - comparable functionality
 - homogeneous control

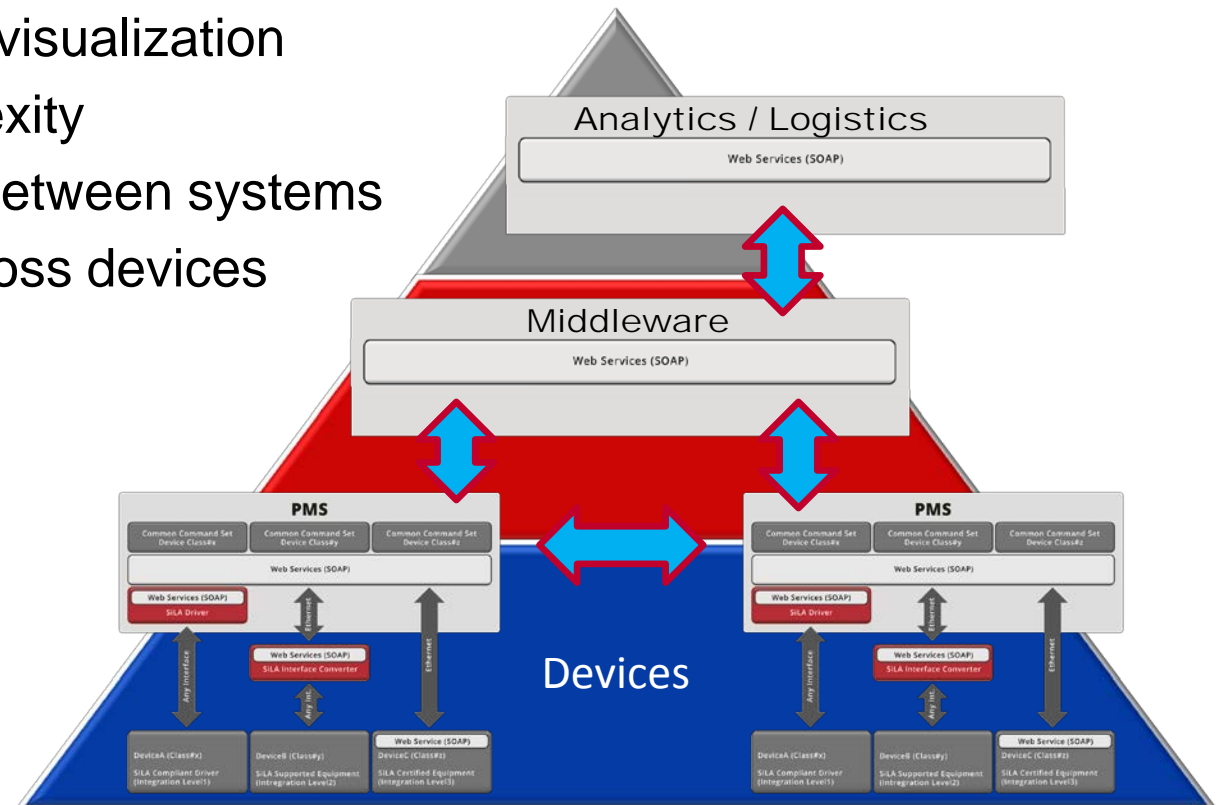
💣 *well, nearly with
heterogeneous data*



SiLA Standard

Data Standard

- Second goal: work in progress...
 - 💣 out-of-the-box visualization
 - 💣 leveled complexity
 - 💣 transparency between systems
 - 💣 data reuse across devices



- Current Scope
 - Extend the Standard to enable data analysis
 - Provide a harmonized database for intra-lab workflows
- Basis
 - Use AnIML as an established (yet modern) data format
 - Provide meta data as well as result data
- Participating SiLA member companies

apartis

xavo

BSSN Software

eppendorf

**BECKMAN
COULTER**
Life Sciences

EQUICON

 **Fraunhofer**
IPA

HAMILTON

 **infoteam**
software AG


www.wega-it.com
wega
works

 **MOLECULAR
DEVICES**

 **Promega**

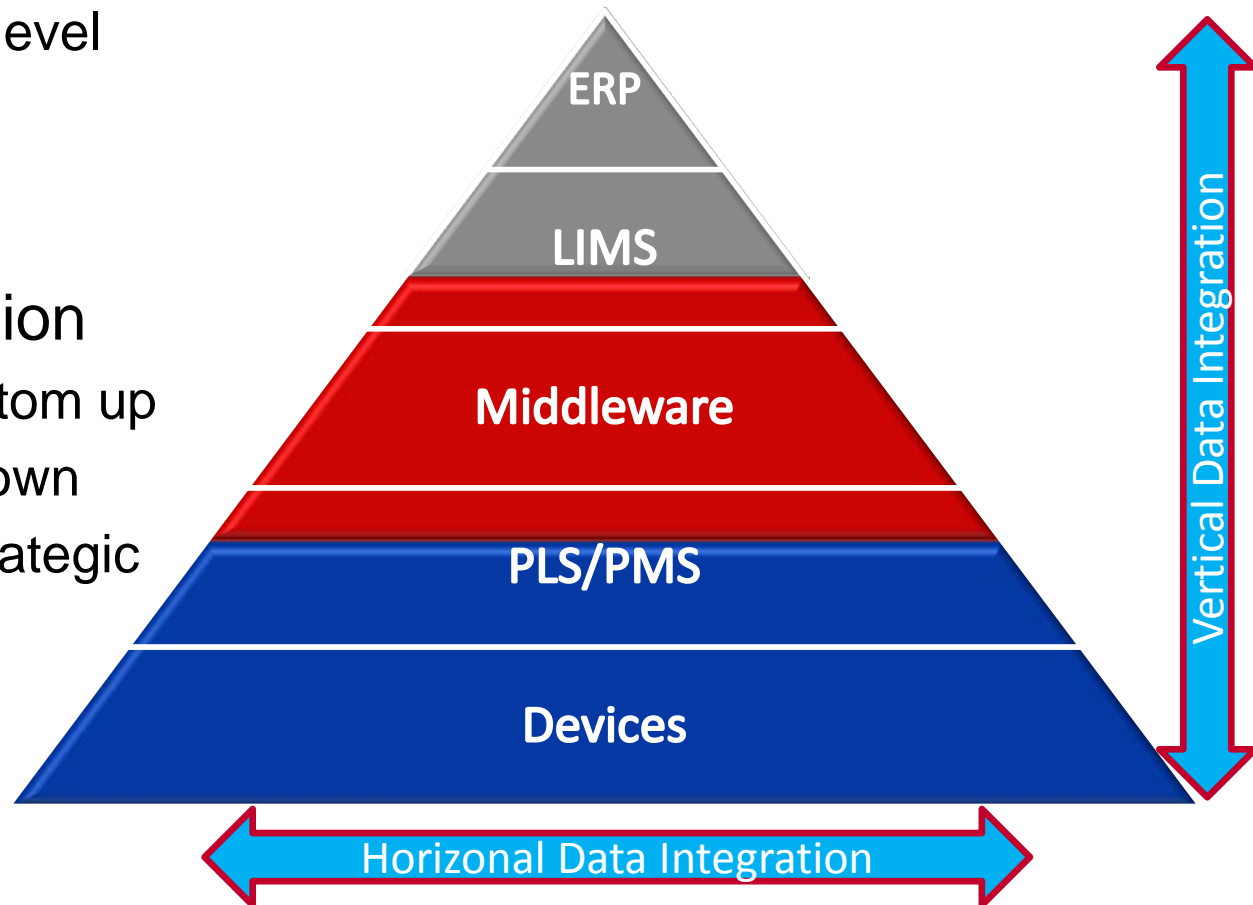
Thermo
SCIENTIFIC
A Thermo Fisher Scientific Brand

METTLER TOLEDO


SiLA Standard

Horizontal & Vertical Integration

- Horizontal integration
 - collected intra-level
 - from next level
 - on every level
- Vertical integration
 - condensed bottom up
 - enriched top down
 - operative to strategic decision level



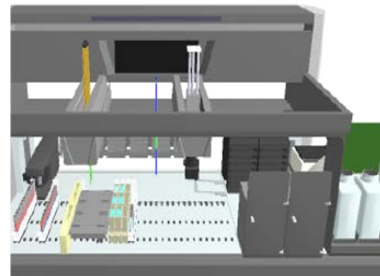
- Elimination of system breaks
 - condensation, enrichment and consolidation of data
 - sharing over labs and even between companies
- Flexibility and security
 - modularization by separation of concerns
 - data fragments and results
 - system reconfiguration through flexible modules
 - (partial) validation and regulatory conformity (IVD, GMP, FDA)
- Investment coverage
 - reuse of existing modules

SiLA Lab Device Process Control Mobile App



Easy
Pairing

Standardized
Interface



▪ Project Definition

Realization of an user-optimized SiLA Consumer PMS App to execute simple workflows on any SiLA device.

▪ Key challenges

Implementing full functional SiLA Consumer PMS on a mobile Device.

Include potential of mobile devices to improve usability

▪ Solution

SiLA compliant Consumer PMS written for Windows Phone 8.1, consisting of cross compilable infoteam basic components and phone specific feature set.

PROJECT CHARACTERISTICS

LANGUAGE/SDE

C#, XAMARIN

TECHNOLOGY

Windows Phone, iOS, ANDROID

SiLA

RFID

QR-Code

NFC

OTHER

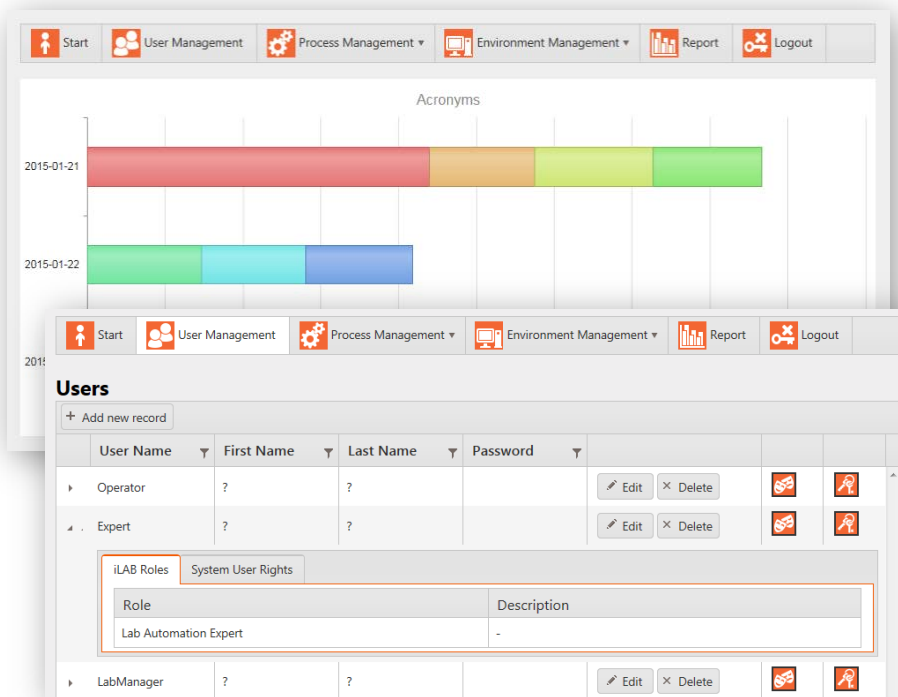
Pairing of App and Lab Device via RFID, QR-Code or NFC



Business Value Delivered

Software requirements analysis, Software Architecture, Usability analysis, Design, Implementation.

Internal Project in close cooperation with customer which delivers a SiLA compliant device to control.



Project Definition

Open, extendable and easy-to-use middleware that optimizes capacity management for leading pharmaceutical manufacturer

Key challenges

Creating a system architecture compliant with the customer's IT requirements

Solution

Web-based application, iLAB Service Host containing business logic and database

Benefits for the customer

Centralized user and access management, system reservation, reporting across lab devices

PROJECT CHARACTERISTICS

LANGUAGE/SDE

MS Visual Studio 2013, TFS 2012
C#, .NET 4.5
Windows 7 64bit
MySQL Database

TECHNOLOGY

HTML5, ASP.NET 4.5, LINQ, WCF, Entity Framework 6, XML, log4net

OTHER

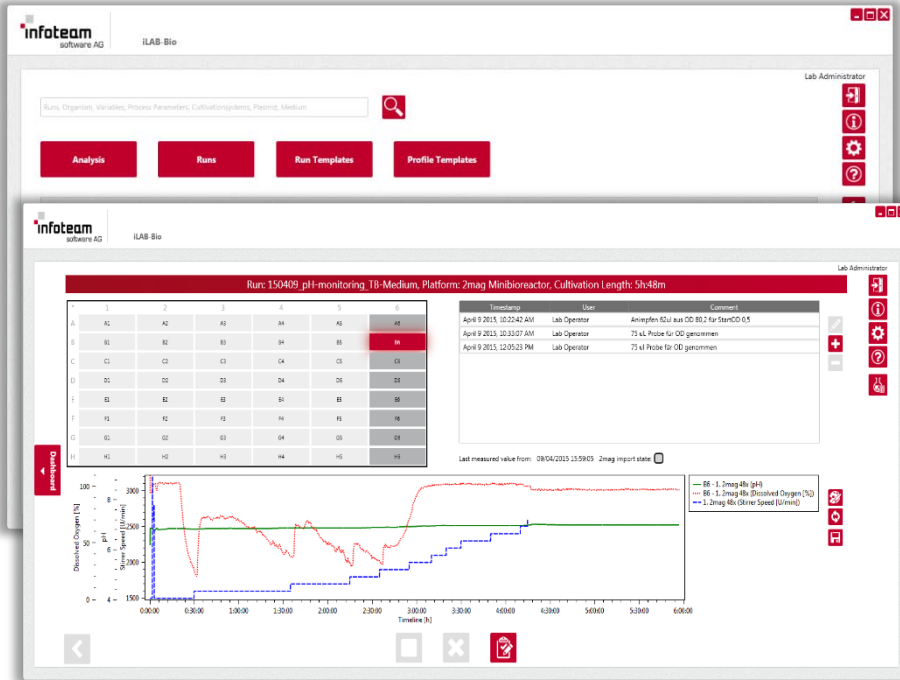
SiLA, Pipetting Robot

Business Value Delivered

Software Requirements Analysis, Software Architecture, Design, Implementation, Test



AUTO BIO



Project Definition

Automated Bioprocess Development

Key challenges

Integration of various liquid handling platforms and bioreactor systems

Solution

Easy-to-use user interface, centralized data management, standards-based communication

Benefits for the customer

Speed-up in bioprocess development, comparability of experiment results across platforms

PROJECT CHARACTERISTICS

LANGUAGE/SDE

MS Visual Studio 2010, TFS 2012

C#, C++, .NET 4.0

Windows 7 32 / 64bit

MySQL Database

TECHNOLOGY

WPF, LINQ, NHibernate, XML, log4net

OTHER

SiLA, OPC, Matlab, DoE, LabVIEW,

Pipetting Robot

IEC13485, IEC62304, ISO14971 iMED

Business Value Delivered

Software Requirements Analysis, Software Architecture, Design, Implementation, Test



- 2015 Highlights
- Data Workgroup
- **Process Management System Workgroup**
- Discussion



Process Management System Specification

- Current Scope
 - exchange execution and experiment data between research IT systems, devices and platforms
 - control combined robotic systems in larger lab automation solutions
- Participating SiLA member companies

analytikjena

 **Brooks**
LIFE SCIENCE SYSTEMS

BSSN Software

EQUICON

 **Fraunhofer**
IPA

 **infoteam**
software AG

HAMILTON

 **TECAN.**

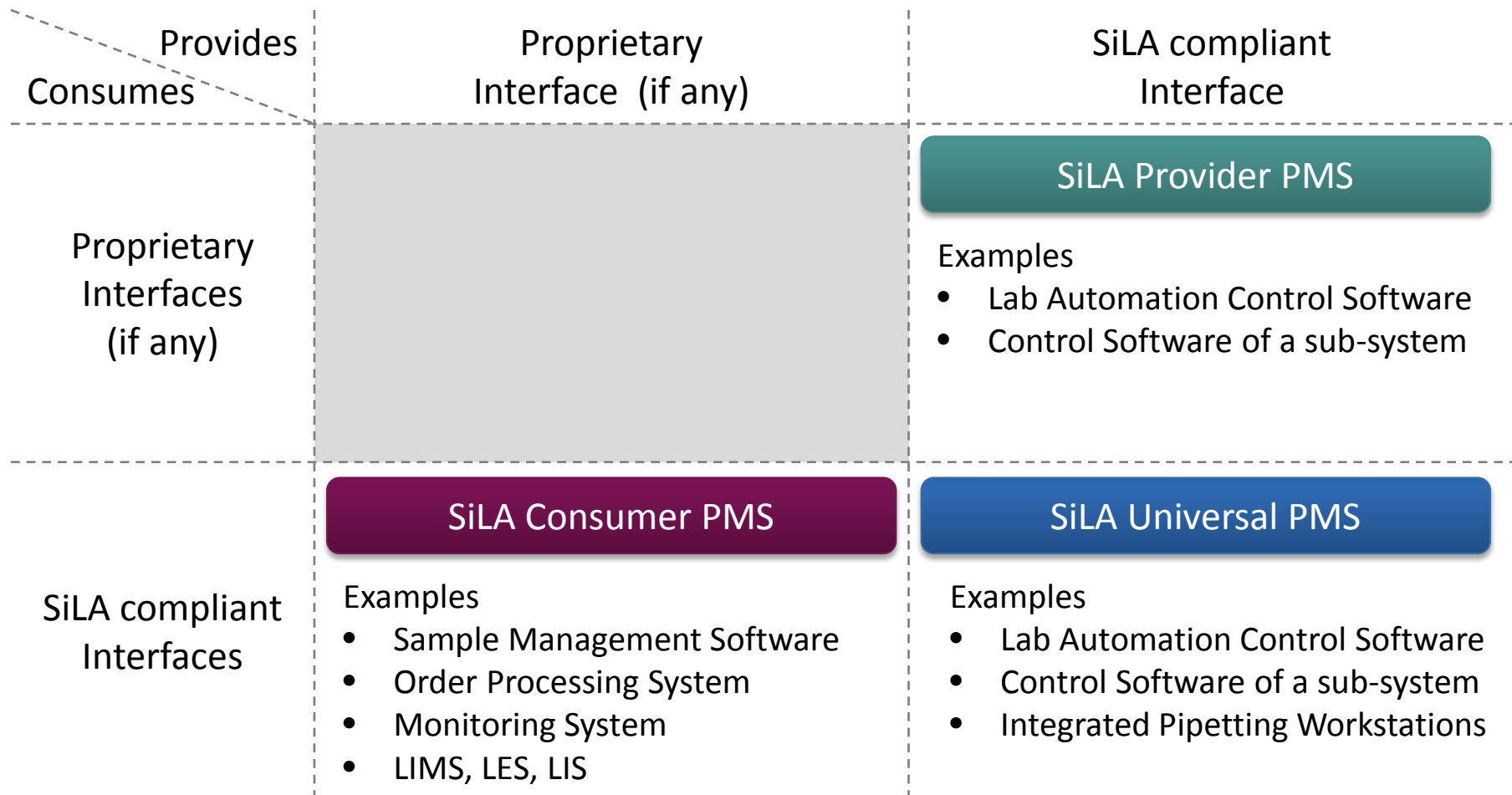
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XAVO

Types of SiLA PMS

Consumer – Provider Matrix



Example Project I: Redefining Cell Culture Automation

Data center



Xavo Lab
Logistics

Sample Management Software

- Management of Cell culture requests
- Planning & reaction on conflict
- Real-time monitoring and inventory

Calls

- Requests
- Methods
- Changes

SiLA

• Inventory data

- Transfer & measurement data
- Start & stop timestamps
- Issues

Laboratory



Excerpt of system interface functionality

- Provides information about
 - Inventory
 - Consumables
 - Expected method durations
- Accepts methods for
 - Harvest & Cell count
 - Split & Plate
 - Load & Unload

Source: Cell Culture Tech Note, Jan 2016, Hamilton Storage

Example Project II: Two systems in HTS

Control
Software

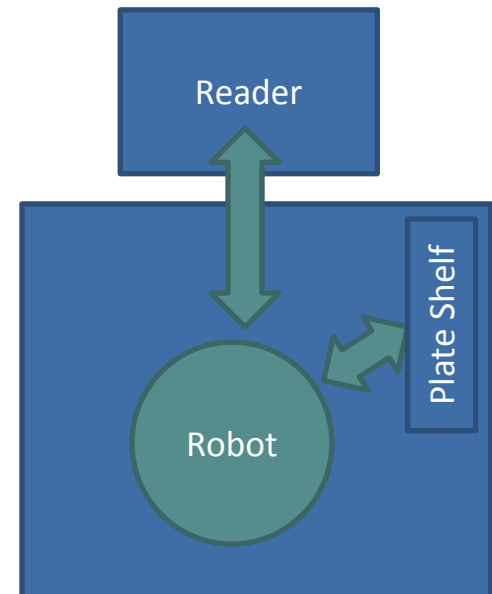


niceLAB

SiLA Consumer PMS

Automation
Equipment

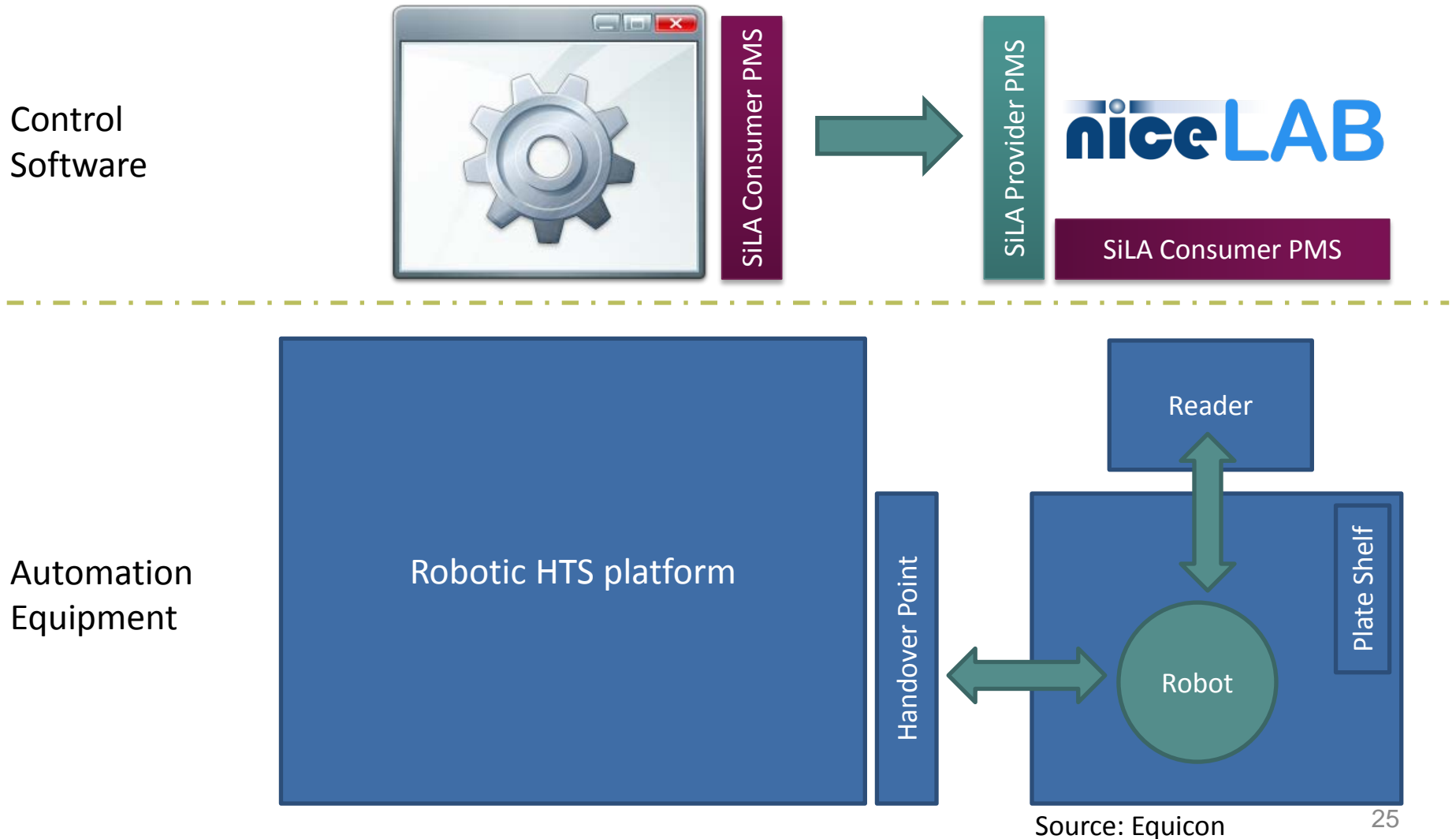
Robotic HTS platform



Source: Equicon

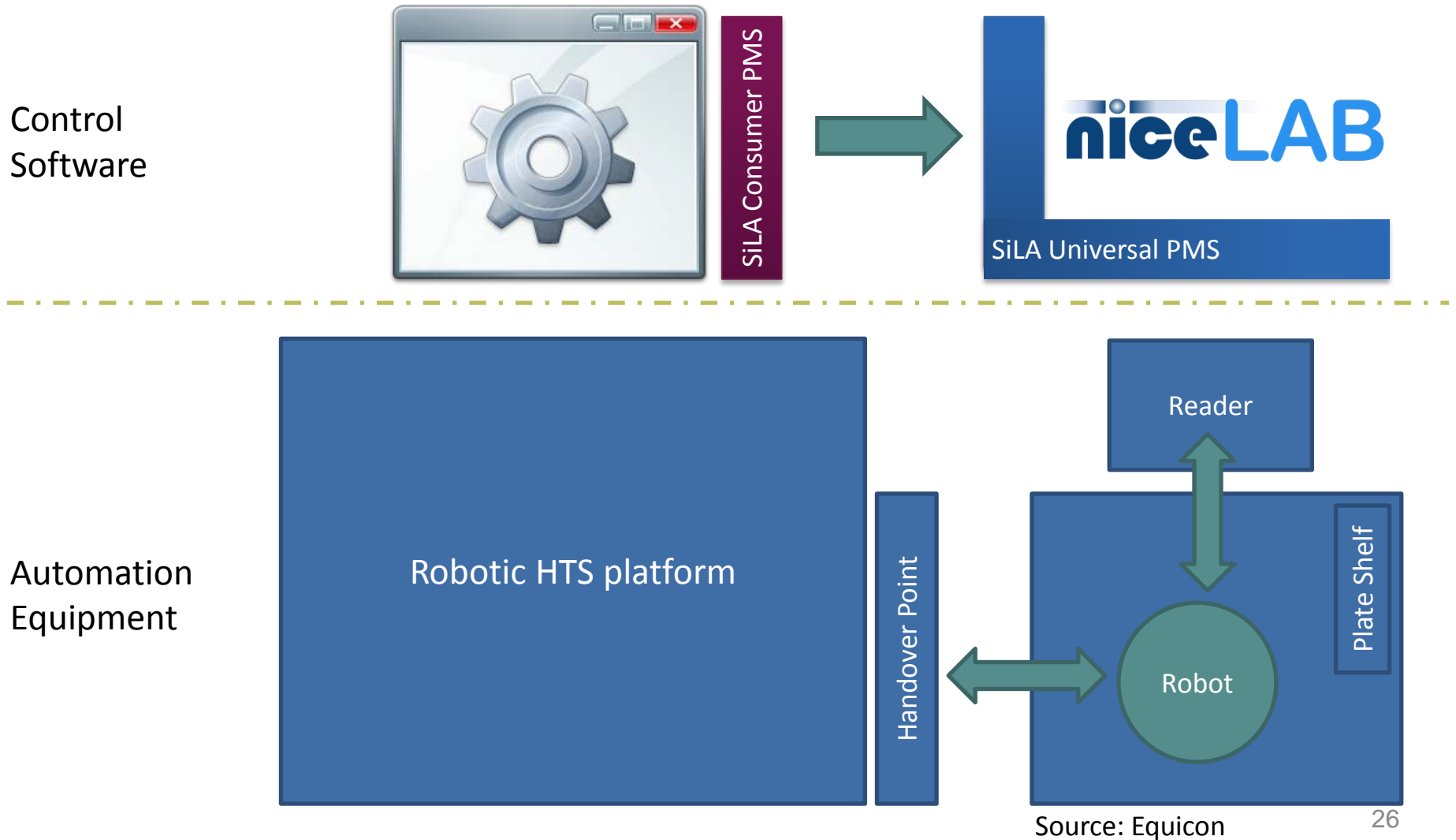
Example Project II:

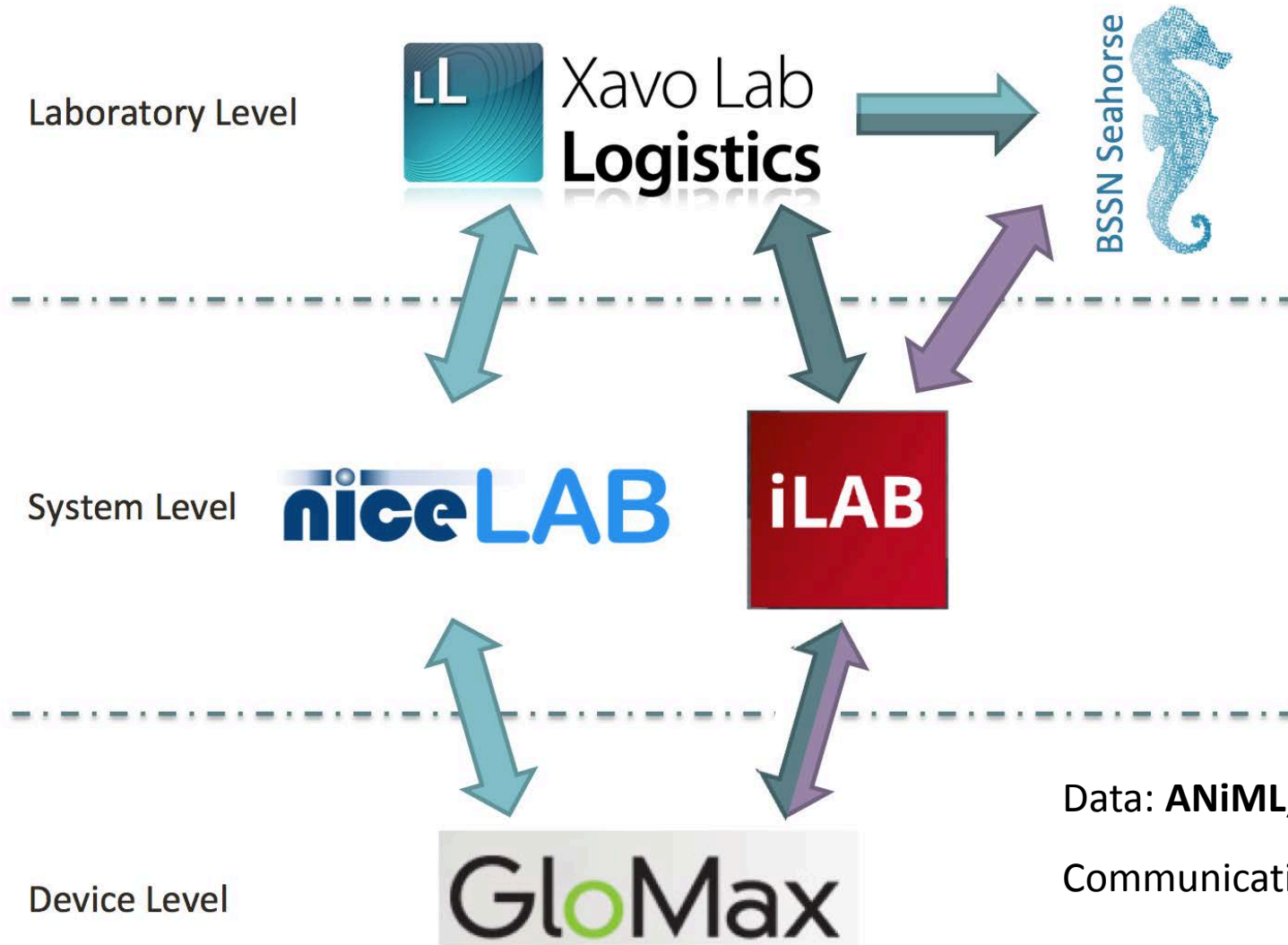
One larger system with sub-system PMS



Example Project II:

One larger system with sub-system PMS





Data: **ANiML**, an ASTM standard

Communication: **SiLA**

Manufacturer's & Integrator's perspective

- Manufacturer's benefit from SiLA
- Integration benefit from SiLA

Microlab VANTAGE

Liquid Handling System™

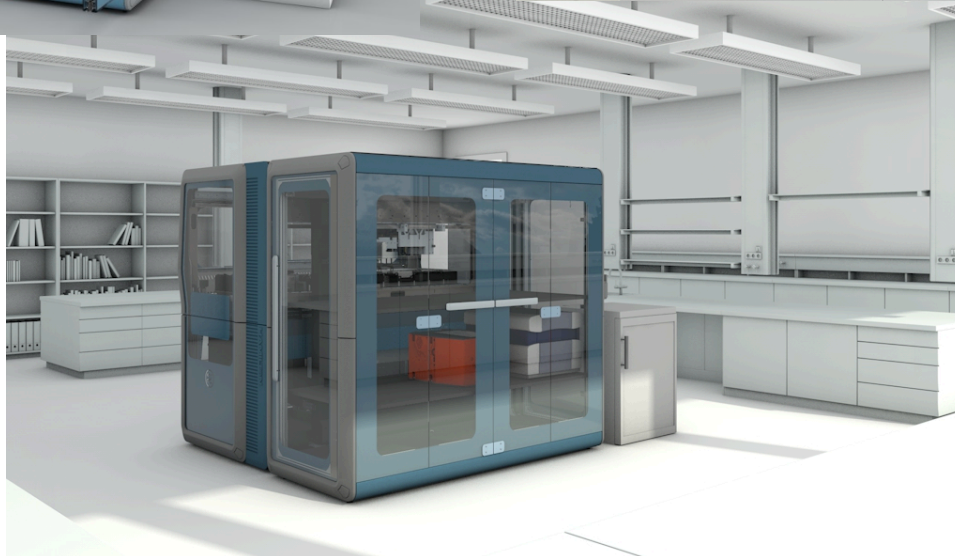
HAMILTON
VANTAGE Liquid Handling System™

PIPETTING EVOLUTION.
LOGISTIC REVOLUTION.
INTEGRATED SOLUTION.



HAMILTON

Integration Platform

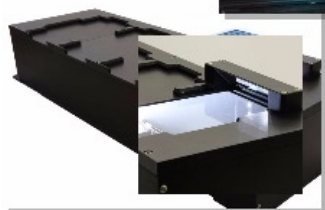


Devices Portfolio

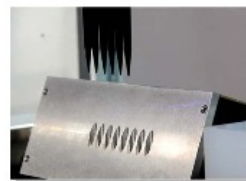
Vacuum Solutions



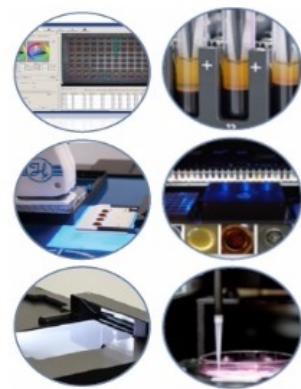
Barcode Reading Solutions



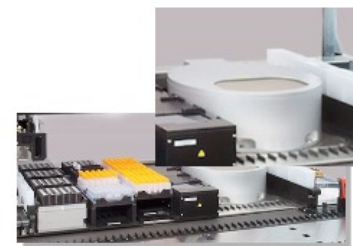
Tip Washing & Modification Solutions



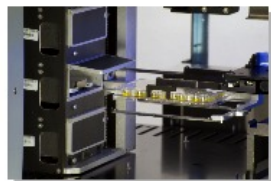
Imaging Solutions



Centrifugation Solutions



Heating & Shaking Solutions



Arm Handling Solutions



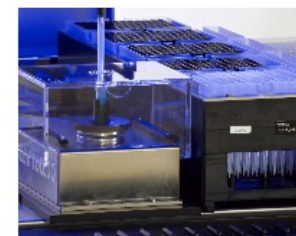
FlipTube Solutions



Reagent Solutions



Other Solutions



- Create single driver for devices
- Authority on device, most qualified to provide up-to-date functionality
- SiLA standard provided framework for more user friendly PMS

- SiLA Integrations
 - Step 1: Plug in device
 - Step 2: ???
 - Step 3: INSTINCT V (our PMS) communicated and controlled device
- BioTek washer & Inheco ODTs



- Streamline device integration
- Speed up system delivery
- Cut down on redundant driver development

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- Process Management System Workgroup
- Discussion



SiLA

Rapid Integration®



Thank you for your
attention!

Become a personal member of SiLA and
register free of charge today at:

www.sila-standard.org